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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/696,622	10/29/2003	Narasimha R. Valieti	VRT0093US	5515
60429	7590	12/22/2006		
CSA LLP 4807 SPICEWOOD SPRINGS RD. BLDG. 4, SUITE 201 AUSTIN, TX 78759			EXAMINER FLOURNOY, HORACE L	
			ART UNIT 2189	PAPER NUMBER
SHORTENED STATUTORY PERIOD OF RESPONSE		MAIL DATE	DELIVERY MODE	
3 MONTHS		12/22/2006	PAPER	

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

**Office Action Summary**

Application No.

10/696,622

Applicant(s)

VALIETI ET AL.

Examiner

Horace L. Flournoy

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on amendment received on 10/10/2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 18 is/are allowed.
- 6) ☒ Claim(s) 1-18, 19 and 20 is/are rejected.
- 7) ☒ Claim(s) 8-9 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### *Response to Amendment*

This Office action has been issued in response to amendment filed December 13<sup>th</sup> 2006. Claims 1-20 are pending. Applicant's arguments have been carefully and respectfully considered, but they are not entirely persuasive, as will be discussed in more detail below, even in light of the instant amendments. Accordingly, this action has been made FINAL.

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-7, 10-17, and 19-20 are rejected under 35 U.S.C. 102(b) as being anticipated by DeKoning et al. (U.S. Patent No. 6,304,942 hereafter referred to as DeKoning) as supported by Humlicek et al. (U.S. Patent No. 5,822,782 hereafter referred to as Humlicek) which is specifically incorporated by reference in DeKoning as cited in column 7, line 4.

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Independent ClaimsWith respect to **independent claims 1 and 12,**

*"A method comprising: a computing node in a network creating a description of a data volume layout, [DeKoning discloses in column 7, lines 52-60, "The process starts with an original storage array controller device connected to a host system. An original storage array is coupled through the original storage array controller device to a host system (see FIG. 1)... The original storage array stores metadata defining the configuration of the logical volume mappings in the storage array."] wherein the data volume is composed from two or more data storage devices on the network; [See DeKoning FIG. 3, elements 108, 110, and 302] first, second and third devices each storing a respective copy of the data volume layout description or respective modified versions thereof in respective memories of the first, second and third devices; [See Humlicek (incorporated by reference) in column 5, lines 20-31, "The present invention includes a data structure stored in a reserved area 122 on each disk drive 110 of the disk array 108. The data structure in the reserved area 122 contains information which uniquely identifies each disk drive from all other disk drives. The data structure stored in the reserved area 122 of each disk drive 110 also includes configuration information which describes each group of the disk array 108 in which the corresponding disk is a member..." ] transmitting data input/output (I/O) transactions between the first device and the second device; transmitting data (I/O) transactions between the first device and the third device." [Humlicek discloses in column 3, lines 36-40, "This added flexibility in RAID*

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subsystem control may be used by an operator to help level the load of I/O requests across RAID subsystems or even across interconnect busses within a particular RAID subsystem.” Humlicek teaches transmitting data I/O transactions between all devices connected in a subsystem]

With respect to **independent claim 19**,

*“A computer readable medium storing instructions, wherein the instructions are executable by a processor in a second device in a network containing a first device, the second device, and a third device, [See DeKoning FIG. 3, elements 108, 110, and 302] wherein the network stores a data volume, wherein the first device is configured to transmit I/O transactions to the second device, and wherein the first device is configured to transmit V0 transactions to the third device, [Humlicek discloses in column 3, lines 36-40, “This added flexibility in RAID subsystem control may be used by an operator to help level the load of I/O requests across RAID subsystems or even across interconnect busses within a particular RAID subsystem.” Humlicek teaches transmitting data I/O transactions between all devices connected in a subsystem] the method comprising: the second device receiving and storing in memory thereof, a description of a data volume layout created and transmitted by the first data device; [See Humlicek (incorporated by reference) in column 5, lines 20-31, “The present invention includes a data structure stored in a reserved area 122 on each disk drive 110 of the disk array 108. The data structure in the reserved area 122 contains information which uniquely identifies each disk drive from all other disk drives. The data structure*

stored in the reserved area 122 of each disk drive 110 also includes configuration information which describes each group of the disk array 108 in which the corresponding disk is a member..."] *the second device receiving an write I/O transaction from the first device, [DeKoning discloses in column 8, lines 35-36, "...I/O (input/output) operations from a host system."]* wherein the write I/O transaction comprises data D in response to receiving the write I/O data transaction, the first second device accessing the data volume layout description or the modified version thereof stored in memory of the first device; [DeKoning teaches this limitation, e.g. in column 7, lines 1-6. DeKoning further discloses in column 7, lines 10-11, "After reading the metadata from each storage disk..." See also Humlicek, which is incorporated by reference.] *in response to accessing the data volume layout description or the modified version thereof stored in memory of the second device, the second device A writing data D to separate memory locations within the second device."* [DeKoning teaches this limitation, e.g. in column 7, lines 1-6. DeKoning further discloses in column 7, lines 10-11, "After reading the metadata from each storage disk..." See also Humlicek, which is incorporated by reference.]

With respect to independent claim 20,

"A network comprising: a first device coupled to second and third devices, [See DeKoning FIG. 3, elements 108, 110, and 302] wherein the first device is configured to transmit V0 data transactions to the second and third devices; [Humlicek discloses in column 3, lines 36-40, "This added flexibility in RAID

subsystem control may be used by an operator to help level the load of I/O requests across RAID subsystems or even across interconnect busses within a particular RAID subsystem.” Humlicek teaches transmitting data I/O transactions between all devices connected in a subsystem] *wherein the first device is configured to create a description of a data volume layout, [See Humlicek (incorporated by reference) in column 5, lines 20-31, “The present invention includes a data structure stored in a reserved area 122 on each disk drive 110 of the disk array 108. The data structure in the reserved area 122 contains information which uniquely identifies each disk drive from all other disk drives. The data structure stored in the reserved area 122 of each disk drive 110 also includes configuration information which describes each group of the disk array 108 in which the corresponding disk is a member...”]* *wherein data of the data volume is stored in two or more data storage systems of the network; [See DeKoning FIG. 3, elements 108, 110, and 302]* *wherein the first device is configured to store the data volume layout description in memory of the first device; wherein the second and third devices are configured to store a copy of the data volume layout description or respective modified versions thereof in respective memories of the second and third devices.” [See Humlicek (incorporated by reference) in column 5, lines 20-31, “The present invention includes a data structure stored in a reserved area 122 on each disk drive 110 of the disk array 108. The data structure in the reserved area 122 contains information which uniquely identifies each disk drive from all other disk drives. The data structure stored in the reserved area 122 of each disk drive 110 also includes configuration*

information which describes each group of the disk array 108 in which the corresponding disk is a member...”]

#### Dependent Claims

With respect to **claims 2 and 13**,

*“The method of claim 1 wherein the data volume layout description relates virtual storage objects of the data volume to other virtual storage objects of the data volume.” [DeKoning teaches this limitation, e.g. in column 1, lines 18-25]*

With respect to **claims 3 and 14**,

*“The method of claim 1 wherein the data volume layout description relates virtual storage objects of the data volume to one or more data storage systems of the network.” [DeKoning teaches this limitation, e.g. in column 1, lines 18-25]*

With respect to **claims 4 and 15**,

*“The method of claim 1 wherein the first device comprises a host node, [See DeKoning FIG. 3, element 102] wherein the second device comprises a first data storage system that stores a first portion of data of the data volume, [See DeKoning FIG. 3, element 108] and wherein the third device comprises a second data storage system that stores a second portion of data of the data volume.” See DeKoning FIG. 3, element 110]*



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With respect to **claim 5**,

*"The method of claim 1 wherein the computing node is contained within the first, second, or third device."* **[See DeKoning FIG. 3, element 102]**

With respect to **claim 6**,

*"The method of claim 1 wherein the first device comprises a host node, [See DeKoning FIG. 3, element 102] wherein second device comprises a data storage system that stores a portion of data of the data volume, [See DeKoning FIG. 3, element 108] and wherein the third device comprises a switch coupled between the host node and the data storage system."* **[See DeKoning FIG. 3, element 310]**

With respect to **claims 7, 16, and 17**,

*"The method of claim 4 further comprising: the host node generating a write I/O transaction to write new data, [DeKoning discloses in column 8, lines 35-36, "...I/O (input/output) operations from a host system."]* wherein the write I/O transaction comprises the new data after receiving the write I/O data transaction, the first data storage system generating another transaction to write the new data; the first data storage system transmitting the other transaction to the second data storage system." **[Humliceck discloses in column 3, lines 36-40, "This added flexibility in RAID subsystem control may be used by an operator to help level the load of I/O requests across RAID subsystems or even across interconnect busses within a particular RAID subsystem."**

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**Humlicek teaches transmitting data I/O transactions between all devices connected in a subsystem]**

With respect to **claims 11 and 17,**

*"The method of claim 1 further comprising: the computing node modifying the data volume layout description; the first, second and third devices [DeKoning teaches this limitation, e.g. in column 7, lines 1-6. DeKoning further discloses in column 7, lines 10-11, "After reading the metadata from each storage disk..." See also Humlicek, which is incorporated by reference.] overwriting their respective data volume layout descriptions or their respective modified versions of the data volume layout descriptions with a copy of the modified data volume layout description or the respective modified versions thereof." [Humlicek discloses in column 3, lines 36-40, "This added flexibility in RAID subsystem control may be used by an operator to help level the load of I/O requests across RAID subsystems or even across interconnect busses within a particular RAID subsystem." Humlicek teaches transmitting data I/O transactions between all devices connected in a subsystem]*

With respect to **claim 16 (and claim 10),**

*"The computer readable medium of claim 15 wherein the method further comprises: the host node generating a write I/O transaction to write new data, wherein the write I/O transaction comprises the new data; [DeKoning discloses in column 7, lines 52-60, "The process starts with an original storage array*

controller device connected to a host system. An original storage array is coupled through the original storage array controller device to a host system (see FIG. 1)... The original storage array stores metadata defining the configuration of the logical volume mappings in the storage array.”] *the host node transmitting the write I/O transaction to only the first data storage system.” [DeKoning discloses in column 8, lines 52-63, “...The two devices A1 and A2 in the first storage array are now available to store new data.”]*

#### ***Allowable Subject Matter***

Claim 18 is allowable over the prior art of record.

Claims 8 and 9, are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

#### **ARGUMENTS CONCERNING PRIOR ART REJECTION**

##### **1<sup>ST</sup> POINT OF ARGUMENT:**

Applicant's arguments filed on 10/10/2006 have been fully considered but they are not persuasive. With respect to the arguments on page 7, paragraphs 2-4 of the applicant's remarks, the examiner believes that the limitation “*first, second and third devices each storing a respective copy of the data volume layout description or respective modified versions thereof in respective memories of the first, second and third devices.*” is

taught by Humlicek in column 5, lines 20-31. Humlicek discloses, "The present invention includes a data structure stored in a reserved area 122 on each disk drive 110 of the disk array 108. The data structure in the reserved area 122 contains information which uniquely identifies each disk drive from all other disk drives. The data structure stored in the reserved area 122 of each disk drive 110 also includes configuration information which describes each group of the disk array 108 in which the corresponding disk is a member..." This teaching by Humlicek specifically discloses storing data in the respective memories of the devices (in the reserved area(s) 122 on each disk), not in the respective disk drive.

*Humlicek teaches the storing of a respective copy (information which uniquely identifies each disk drive from all other disk drives) of the data volume layout description (configuration information) or respective modified versions thereof in respective memories of the first, second and third devices (Humlicek discloses in FIG. 1 a first, second and third device, 110, which also each contain a respective memory or data structure in a reserved area 122).*

**2<sup>nd</sup> POINT OF ARGUMENT:**

With respect to the arguments on page 8 of the applicant's remarks, the examiner believes that the limitation "*transmitting data input/output (I/O) transactions between the first device and the second device; transmitting data (I/O) transactions between the first device and the third device.*" is taught by Humlicek in column 5, lines 20-31.

The examiner agrees that Humlicek discloses in column 3, lines 36-40 load-balancing of I/O requests in a RAID subsystem. However, this teaching anticipates the transmitting of I/O transactions (e.g. I/O requests) between the first device and the second device and between the first device and the third device. Load-balancing incorporates communication, via the controller or host of all the assigned (balanced) devices in a system, and in this case, with respect to I/O transactions. Therefore the examiner believes that this teaching by Humlicek anticipates this limitation in combination with the limitation "*first, second and third devices each storing a respective copy of the data volume layout description or respective modified versions thereof in respective memories of the first, second and third devices.*"

### **CONCLUSION**

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

### **Direction of Future Correspondences**

Any inquiry concerning this communication or earlier communication from the examiner should be directed to Horace L. Flournoy whose telephone number is (571) 272-2705. The examiner can normally be reached on Monday through Friday 8:00 AM to 5:30 PM (ET).

### **Important Note**

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Reginald G. Bragdon can be reached on (571) 272-4204. The fax phone

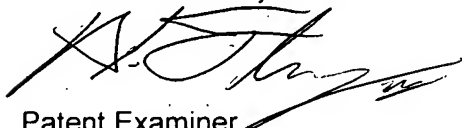
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numbers for the organization where this application or proceeding is assigned is (703) 746-7239.

Information regarding the status of an Application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or PUBLIC PAIR. Status information for unpublished applications is available through Private Pair only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

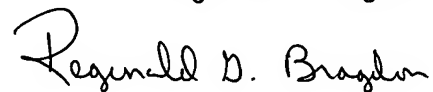
Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (571) 272-2100.

Horace L. Flournoy



Patent Examiner  
Art unit: 2189

Reginald G. Bragdon



Supervisory Patent Examiner  
Technology Center 2100